

NEW FOSSIL CRABS, *PLAGIOPHTHALMUS IZETTI*,  
*LATHETICOCARCINUS SHAPIROI*, AND  
*SAGITTIFORMOSUS CARABUS*  
(CRUSTACEA, DECAPODA), FROM THE WESTERN  
INTERIOR CRETACEOUS, U.S.A.

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*Abstract.*—Collections of the U.S. Geological Survey (Denver) yielded three new species of crabs from the Cretaceous rocks of the Western Interior. *Plagiophthalmus izetti*, n. sp. and *Latheticocarcinus shapiro*, n. gen., n. sp. are primitive crabs assigned to the Dromioidea. *Plagiophthalmus izetti* extends the geographic range of *Plagiophthalmus* from Europe (Albian-Cenomanian-Danian) into North America (Campanian). *Latheticocarcinus shapiro* (Maastrichtian) is an enigmatic species which may be a descendant of *Dakoticancer*. *Sagittiformosus carabus* is a primitive dorippid with highly aberrant carapace morphology.

Recent studies of the Cretaceous crabs of North America have included examination of the Cretaceous paleontologic collections of the United States Geological Survey in Denver (USGS). In that collection were found the three species of Western Interior crabs described herein (Fig. 1). A second collection of specimens comprising *Latheticocarcinus shapiro*, n. sp. was made available by a private collector, Mr. Robert Shapiro of New York City.

These three new species join the previously described Western Interior decapod faunas (Rathbun 1917; Bishop 1973, 1976, 1978, 1981, 1982, 1983a, b, c, 1985a, b, 1986b; Feldmann, Bishop, & Kammer 1977; Feldmann & Maxey 1980; Kues 1980; Bishop & Williams 1986). In contrast to the decapod-dominated Assemblages, including the *Dakoticancer* Assemblages, the Heart Tail Ranch Assemblage, and the Carlile *Linuparus* Assemblage, these crabs occur as isolated remains in faunas dominated by molluscs.

Systematic Paleontology

Superfamily DROMIOIDEA de Haan, 1833  
Family PROSOPIDAE von Meyer, 1860

Subfamily PITHONOTINAE

Glaessner, 1933

Genus *Plagiophthalmus* Bell, 1863

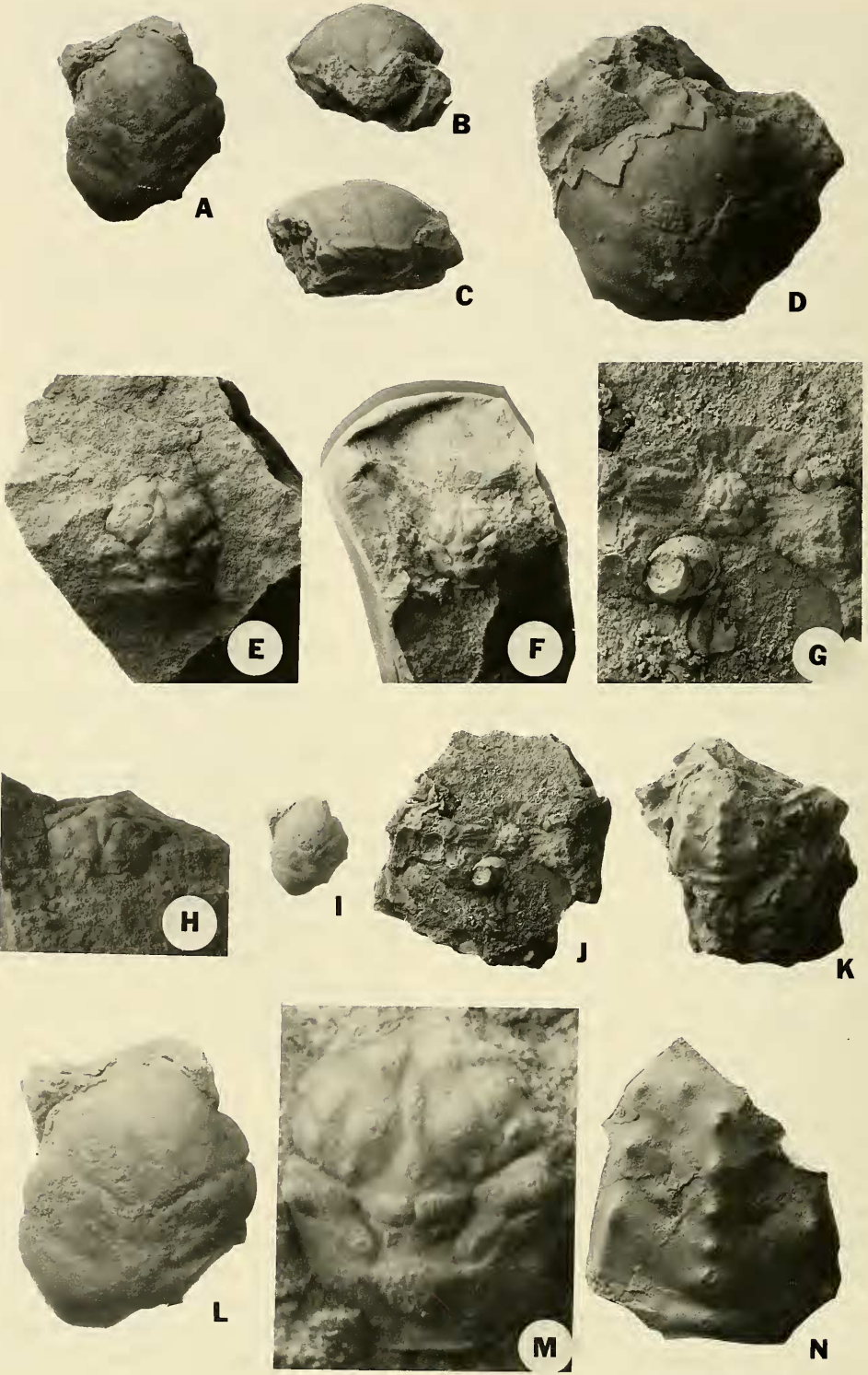
*Type species.*—The type species of *Plagiophthalmus* Bell, 1863, is *Plagiophthalmus oviformis* Bell, 1863, by monotypy.

*Diagnosis.*—Cephalothorax varying from broad with convex lateral margins to elongate with straight lateral margins; widest near middle; longitudinally and transversely arched. Lateral margins distinct, sometimes with prominent lateral spines. Rostrum short, downturned, broadly bilobed. Cervical and branchiocardiac furrows equal, well marked; carapace finely pitted. No emarginations in carapace for last pereopods.

*Plagiophthalmus izetti*, new species

Fig. 1A-C, D, I, L

*Diagnosis.*—Carapace elongate, ovate; arched longitudinally and transversely; smooth except for tumid branchial ridges, prominent frontal ridges, and subtle mesogastric groove. Cervical and branchiocardiac grooves deep, anterior of branchiocardiac shallow, swinging back to anterolateral



margin. Cervical notch on anterolateral margin deep; carapace widest on mesobranchial lobe near midpoint; branchiocardiac groove forms marginal notches, posterolateral margin convergent; posterior of carapace missing.

*Occurrence.*—The holotype (Fig. 1A–C), deposited in the National Museum of Natural History (USNM), Washington, D.C. (USNM 418272) was collected from the Pierre Shale by Glen A. Izett (Col. No. CD-71-50) in the NE  $\frac{1}{4}$ , NE  $\frac{1}{4}$ , Sec. 25, T.3 N., R. 17 W., Grand Co., Colorado (USGS Locality D8090) from the zone of the ammonite *Baculites scotti*, an index fossil to upper Campanian rocks. The paratype (Fig. 1D) (USNM 418273) was collected from the Pierre Shale in the SE  $\frac{1}{4}$ , SE  $\frac{1}{4}$ , SE  $\frac{1}{4}$ , Sec. 29, T.2 S., R. 70 W., Jefferson County, Colorado, on 4 Nov 1955 by G. R. Scott, R. Van Horn, and W. A. Cobban (USGS Locality D596) from the zone of *Didymoceras cheyennense*.

*Description.*—Carapace elongate (L/W = 1.2), widest through middle, arched transversely and longitudinally, regions poorly differentiated by grooves, smooth. Cephalic arch poorly differentiated, diamond-shaped, bounded by broadly bilobed rostrum, slightly sinuous anterolateral margins and slightly sinuous broad, deep cervical furrow; only anterior tongue of mesogastric region delimited; faint hints of posterior parts of mesogastric and hepatic grooves split off cervical groove. Sides of rostrum raised into anterolateral margins, passing through cer-

vical notches, becoming parallel, passing through branchiocardiac notch, converging toward missing posterior margin. Scapular arch well differentiated by cervical and branchiocardiac furrows; anterior part of branchiocardiac furrow obsolete distally, not reaching carapace margin; posterior part deep, forming notch where it meets dorsal shield margin. Epibranchial and mesobranchial regions thus partly separated; both well separated from broad metabranchial region. Cardiac region transverse with a granule on each side; intestinal region not delineated.

*Comparison.*—*Plagiophthalmus izetti* differs from *P. oviformis* Bell, 1863, by having a more triangular anterior, a more rapidly narrowing posterior, a better defined mesobranchial-epibranchial groove and two granules on its cardiac region. *Plagiophthalmus izetti* differs from *P. nitonensis* Wright & Wright, 1950, by having a more triangular front, lacking lateral spines, and having a more complete mesobranchial-epibranchial groove. *Plagiophthalmus izetti* is relatively much longer than *P. tribolet* Wright & Collins, 1972, and lacks the numerous nodes and tubercles of *P. nodosus* Wright & Collins, 1972.

*Types.*—The holotype (USNM 418272) and paratype (USNM 418273) are deposited in the collection of the United States National Museum of Natural History, Washington, D.C. 20560.

*Etymology.*—*Plagiophthalmus izetti* is named in honor of G. A. Izett, who collected the type specimens.

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Fig. 1. New Western Interior Cretaceous crabs. A–D, *Plagiophthalmus izetti*: A–C, Holotype (USNM 418272) in dorsal, anterior, and right lateral views ( $\times 2.0$ ); D, Paratype 1 (USNM 418273) in dorsal view ( $\times 2.0$ ). E–H, *Latheticocarcinus shapiro*: E, H, Holotype (USNM 418474) in dorsal and anterior views ( $\times 2.0$ ); F, Paratype 1 replica of impression (USNM 418275) in dorsal view ( $\times 2.0$ ); G, Paratype 2 (USNM 418276) in dorsal view ( $\times 2.0$ ); *Sagittiformosus carabus*: K, N, Holotype (USNM 418277) in dorsal view. I–K, L–N, Comparative dorsal views of new species from the Western Interior Cretaceous at normal size (I–K) and enlarged (L,  $\times 3.0$ ; M,  $\times 7.1$ ; N,  $\times 2.0$ ); *Plagiophthalmus izetti* (Holotype USNM 418272); *Latheticocarcinus shapiro* (Paratype 1, USNM 418275); and *Sagittiformosus carabus* (Holotype, USNM 418277).

## Superfamily DAKOTICANCROIDEA

Rathbun, 1917

## Family DAKOTICANCRIDAE

Rathbun, 1917

*Latheticocarcinus*, new genus

*Type species.*—The type species is *Latheticocarcinus shapiro*, n. sp.

*Diagnosis.*—Carapace very small, elongate, front rounded, posterior is rectangular; widest just ahead of midpoint; regions well delineated by grooves, tumid with broad, low bosses. Rostrum short, downturned, medially grooved; orbits occupy over half carapace width, rims beaded with granules.

*Etymology.*—*Latheticocarcinus* is derived from the Greek *lathetikos* (likely to be forgotten or overlooked) + *karkinos* (crab), masculine.

*Latheticocarcinus shapiro*, new species

Fig. 1E–H, J, M

*Diagnosis.*—Same as for the genus *Latheticocarcinus*.

*Occurrence.*—The holotype (USNM 418274) was collected in 1940 by W. A. Cobban (WAC #1) from the Maastrichtian Fox Hills Formation on the Grand River, Corson County, South Dakota. Two paratypes (USNM 418275 and 418276) were collected by Robert Shapiro, either near Red Bird, Wyoming, or from the Fox Hills of Central South Dakota. The age of the holotype is Maastrichtian and the paratypes either Campanian or Maastrichtian.

*Description.*—Carapace very small, widest anterior to middle, elongate ( $L/W = 1.21$ ), front oval, posterior rectangular; arched longitudinally and transversely; well differentiated by grooves into tumid regions. Anterolateral borders rounded (except for slightly projecting rostrum) to cervical notch, widening to maximum width on epibranchial ridge; posterolateral margins slightly convex, rounding abruptly onto rather straight, slightly raised posterior margin.

Grooves between mesogastric, protogastric, and urogastric regions shallow but well

defined; cervical groove deep, sinuous, incomplete across gastric ridge; continuous with branchiocardiac groove, distally obsolete between epibranchial and mesobranchial regions; posterior of branchiocardiac regions nearly obsolete at anterior of cardiac region, fairly well defined posteriorly, outlining cardiac and intestinal regions; groove between metabranchial and mesobranchial regions indistinct. Mesogastric region triangular with long, narrow anterior tongue; widening slightly, then decreasing in width to point, forming single anterior medial groove, surmounted by 2 transverse bosses at species behind and one boss at widened place on anterior tongue. Protogastric region with 4 bosses arranged in shape of a diamond, bosses progressively decrease in size in order of proximal-anterior-distal-posterior. Rostrum short?, downturned, medially grooved; swollen boss. Frontal region narrow; orbits 22% of front, not fissured, beaded with granulation; hepatic region mostly on carapace wall and one boss just ahead of cervical groove on dorsum; urogastric region narrow, crescentic, slightly tumid. Cardiac region large, triangular, with transverse anterior base, slight boss at posterior base. Intestinal region small, with subtle central boss. Branchial region divided into well defined epibranchial ridge, three bosses in shape of a triangle, base oblique running forward and outward, the distal and anterior bosses nearly a continuous ridge. Mesobranchial region a narrow ridge, almost continuous with cardiac region, with subtle boss proximally. Metabranchial region wide, swollen distally, small boss proximally.

*Comparison.*—*Latheticocarcinus shapiro* is similar to *Vectis wrighti* Withers, 1945, in the elongate nature of the carapace but differs in being widest across the middle, wider across the front, and differently ornamented. *Latheticocarcinus shapiro* is most similar to members of the Family Dakoticancridae, particularly to *Tetracarcinus subquadratus* Weller, 1905, but differs by being even more elongate and hav-

ing tumid bosses on the carapace lobes. The geographic and stratigraphic proximity of *Dakoticancer* in rocks slightly older than the Fox Hills Formation makes the possibility that *L. shapiro* is a descendant of *Dakoticancer* or *Tetracarcinus* an intriguing possibility.

*Types*.—The holotype (USNM 418274), paratype 1 (USNM 418275), and paratype 2 (USNM 418276) are deposited in the collection of the National Museum of Natural History, Washington, D.C.

*Etymology*.—*Latheticocarcinus shapiro* is named in honor of Robert Shapiro who collected the two paratypes.

### Superfamily DORIPPOIDEA

de Haan, 1841

Family DORIPPIDAE de Haan, 1841

Subfamily DORIPPINAE de Haan, 1841

*Sagittiformosus*, new genus

*Type species*.—The type species of *Sagittiformosus* is *Sagittiformosus carabus*.

*Etymology*.—The generic name, *Sagittiformosus*, is derived from the arrow-like shape of the type species (Latin; *sagitta*, arrow; *formosus*, beautifully shaped). Gender masculine.

*Diagnosis*.—Carapace rounded-pentagonal, longer than wide ( $l/w = 1.12$ ), widest near the posterior, flat, sides slanted, poorly differentiated by grooves, 3 longitudinal rows of spines, one median sagittal with 6 spines, 2 lateral with 3 spines each, and one convex forward cephalic row of 4 spines (including the anterior spine of each lateral ridge). Cervical furrow broad and shallow distally, obsolete medially; branchiocardiac grooves reduced to depression flanking median sagittal ridge; deep transverse furrow between cardiac and intestinal regions.

*Sagittiformosus carabus*, new species

Fig. 1K, N

*Occurrence*.—The only known specimen of *Sagittiformosus carabus* is a carapace steinkern preserved in calcite cemented sandstone with steinkerns of molluscs. The

specimen was collected by E. A. Merewether, S. C. Hook, and W. A. Cobban 17 Jul 1978 (Coll. #BG-78-8; USGS DI0669) from the Frontier Formation in Fremont County, Wyoming (NE  $\frac{1}{4}$  SW  $\frac{1}{4}$  Sec. 22, T. 33 N., R. 94 W.).

*Diagnosis*.—Same as for genus *Sagittiformosus*.

*Description*.—Carapace rounded, pentagonal, longer than wide ( $l/w = 1.12$ ), widest at posterolateral angles; fairly level. Anterior margin rounded, diverging onto slightly convex lateral margins to obtuse posterolateral angle; posterolateral margin short, straight, and convergent posteriorly. Hind margin slightly sinuous and slightly concave at midpoint. Carapace grooves poorly developed; regions poorly delineated. Cervical groove broad and shallow distally, obsolete medially. Branchiocardiac groove reduced to a depression with extremely subtle anterior and lateral troughs that persist for short distances. A distinct transverse groove parallels the posterolateral and posterior margins, becoming obsolete near the lateral margins. The posterior margin is raised into an upturned rim. Three longitudinal rows and one transverse row of spines ornament carapace. Six median sagittal spines: 2 mesogastric, one urogastric (?), 2 cardiac, and one intestinal (on ridge behind transverse groove) flanked by 2 rows of 3 spines each, one hepatic and 2 branchial, just inside lateral margins of dorsum and forming a straight line coinciding with slope break onto slanted carapace sides. A convex forward row of 4 spines, one each on hepatic and protogastric regions, originates with anterior spines of lateral rows. A pair of tiny granules flank fourth medial spine (anterior cardiac spine).

*Comparison*.—*Sagittiformosus carabus* exhibits the characteristics of the subfamily Dorippinae and is similar to *Dorippe* Weber, 1795, and *Goniochele* Bell, 1858, in carapace outline, differing significantly from all of them by being spinose and tuberculate.

*Type specimen*.—The holotype (USNM

418277) and only known specimen is deposited in the collection of the National Museum of Natural History, Washington, D.C.

*Etymology.*—The crab is named *Sagittiformosus* + *carabus*, Latin, a sea crab.

### Conclusions

The description of these scarce decapod remains from molluscan assemblages from the Western Interior Cretaceous Seaway reemphasizes the rarity of fossil decapods preserved under “normal” conditions. Aside from decapod-rich or decapod-dominated assemblages, the chances of preserving and collecting fossil decapods are greatly diminished (Bishop 1986a). It is much to the credit of Western Interior paleontologists that such scarce remains are found and conserved.

*Plagiophthalmus izetti* represents a relict species finding refuge in the shallow Western Interior Sea long after its acme of development in the Tethys Sea of Europe in the Early and early Late Cretaceous. In this respect, *P. izetti* joins *Ekalakia lamberti* Bishop, 1976, and *Dioratiopus dawsonensis* Bishop, 1973.

It is expected that additional specimens of the diminutive crab, *Latheticocarcinus shapiro*, found high in the Pierre Shale and Fox Hills Formation of South Dakota and Wyoming will be found as curators of collections from those rocks become aware of and search for these tiny remains. As with many new decapod taxa described from scarce material, substantiation of the correct taxonomic assignment of this species must await additional specimens and analysis of new data derived from them.

All three new species are endemic to the Western Interior Late Cretaceous. This pattern of distribution, however, is highly suspect because of the nature of preservation as single or but a few specimens. The problem of sample size can only be overcome by continued collecting.

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### Literature Cited

- Bell, T. 1863. A monograph of the fossil Malacostreacous Crustacea of Great Britain. Part II. Crustacea of the Gault and Greensand.—Paleontographical Society, London (Monograph) 14:i-xiv, 1–40.
- Bishop, G. A. 1973. *Homolopsis dawsonensis*: A new crab (Crustacea, Decapoda) from the Pierre Shale (Upper Cretaceous, Maastrichtian) of Cedar Creek Anticline, eastern Montana.—*Journal of Paleontology* 47(1):19–20.
- . 1976. *Ekalakia lamberti* n. gen., n. sp. (Crustacea, Decapoda) from the Upper Cretaceous Pierre Shale of eastern Montana.—*Journal of Paleontology* 50:398–401.
- . 1978. Two new crabs, *Sodakus tatankayotankaensis* n. gen., n. sp. and *Raninella oaheensis* n. sp. (Crustacea, Decapoda) from the Upper Cretaceous Pierre Shale of South Dakota.—*Journal of Paleontology* 52:608–617.
- . 1981. Occurrence and fossilization of the *Dakoticancer* Assemblage from the Upper Cretaceous Pierre Shale of South Dakota. Pp. 383–413 in Jane Gray, A. J. Boucot, and W. B. N. Berry, eds., *Communities of the past*. Stroudsburg, Pennsylvania, Hutchinson and Ross, Inc., pp. x + 1–623.
- . 1982. *Homolopsis mendryki*: A new fossil crab (Crustacea, Decapoda) from the Late Cretaceous *Dakoticancer* Assemblage, Pierre Shale (Maastrichtian) of South Dakota.—*Journal of Paleontology* 56(1):221–225.

- . 1983a. Fossil decapod crustaceans from the Early Cretaceous Glen Rose Limestone of central Texas.—Transactions of the San Diego Natural History Society 20:27–55.
- . 1983b. Fossil decapod crustaceans from the Late Cretaceous Coon Creek Formation, Union County, Mississippi.—Journal of Crustacean Biology 3:417–430.
- . 1983c. Two new species of crabs, *Notopocorystes (Eucorystes) eichhorni* and *Zygastrocarcinus griesi* (Decapoda, Brachyura), from the Bearpaw Shale (Campanian) of northcentral Montana.—Journal of Paleontology 57(5):900–910.
- . 1985a. A new crab, *Eomunidopsis cobbani* n. sp. (Crustacea, Decapoda), from the Pierre Shale (Early Maastrichtian) of Colorado.—Journal of Paleontology 59(3):601–604.
- . 1985b. Fossil decapod crustaceans from the Gammon Ferruginous Member, Pierre Shale (Early Campanian), Black Hills, South Dakota.—Journal of Paleontology 59(3):605–624.
- . 1986a. Taphonomy of the North American decapods.—Journal of Crustacean Biology 6(3):326–355.
- . 1986b. A new crab, *Zygastrocarcinus cardsmithi* (Crustacea, Decapoda), from the Lower Pierre Shale, southeastern Montana.—Journal of Paleontology 60(5):1097–1102.
- , & A. B. Williams. 1986. The fossil lobster *Linuparus canadensis*, Carlile Shale (Cretaceous), Black Hills.—National Geographic Research 2(3):372–387.
- Feldmann, R. M., G. A. Bishop, & T. W. Kammer. 1977. Macrurous decapods from the Bearpaw Shale (Cretaceous: Campanian) of northeastern Montana.—Journal of Paleontology 51(6):1161–1180.
- , & M. Maxey. 1980. *Raninella carlilensis*, a new raninid crab from the Carlile Shale (Turonian) of Kansas.—Journal of Paleontology 54(4):858–861.
- Glaessner, M. F. 1969. Decapoda. Pp. 399–533 in R. C. Moore, ed., Treatise on invertebrate paleontology, part R. Arthropoda 4, Volume 2. The University of Kansas Printing Service, Lawrence, Kansas.
- Kues, B. S. 1980. A fossil crab from the Mancos Shale (Upper Cretaceous) of New Mexico.—Journal of Paleontology 54(4):862–864.
- Rathbun, M. J. 1917. New species of South Dakota cretaceous crabs.—United States National Museum Proceedings 52:385–391.
- Weber, F. 1795. Nomenclater entemologious secundum Entomologiam systematioum ill. Fabricii adjectis speciebus recens detectis et varietatibus. Chilonii & Hamburgi. i–viii + 171 p.
- Weller, S. 1905. The fauna of the Cliffwood (N.J.) clays.—The Journal of Geology 13(4):324–337.
- Withers, T. H. 1945. New Cretaceous cirripedes and crab.—Annals and Magazine of Natural History (11)12:554–561.
- Wright, C. W., & J. S. H. Collins. 1972. British Cretaceous crabs.—Paleontographical Society (Monograph) Publication 533:1–114.
- , & E. V. Wright. 1950. Some dromiacean crabs from the English Cretaceous.—Geological Association Proceedings 61:13–17.

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